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CARE OF COOPERATIVE SHELTER BELTS ON THE NORTHERN GREAT PLAINS.

INSTRUCTIONS FOR THE CARE OF SHELTER BELTS AFTER PLANTING.

It is especially important that these instructions in regard to the care of shelter belts after planting should be *carefully read* and *complied with.*

Shelter-belt plantings on the northern Great Plains can not be treated as individual trees, groves, windbreaks, or wood lots are treated in the older settled parts of the country farther east and south. The semiarid conditions prevailing here require different methods of culture in order ultimately to approximate natural forest conditions.

This forest condition is a heavy, compact, untrimmed growth of sufficient density to form a complete shade. This shade keeps out most of the weeds that would otherwise use moisture. It also aids in reducing evaporation. The leaves that fall form a natural mulch, and the heavy accumulation of snow retained in the winter insures an amount of moisture in the spring above the normal.

The spacing distance, together with the continual cultivation until the trees become too thick to work among, assures good-sized trees to form a dense shade.

Until this desired condition is reached all grass and other weeds must be kept out. One summer's growth of Russian thistles or western wheat-grass may kill out a previously healthy shelter belt of two or three years' standing.

CULTIVATION.

Cultivation of the trees in the shelter belt should be frequent enough to keep all weeds from obtaining a foothold. This applies especially to western wheat-grass, often called "bluestem." This grass grows very quickly on newly broken ground and if allowed to spread forms a sod within one season. If not removed as soon

as it starts it is very difficult to kill and will require plowing, which is not the proper treatment for the shelter belt.

Cultivation with a 1-horse cultivator should be continued until about the middle of August. Later work to keep the shelter belt free from weeds should be by hand hoeing or pulling. This applies to Russian thistles, tumbling mustard, and other quick-growing large weeds. Do not allow these weeds to remain in order to "catch the snow." The trees will do that without assistance. The weeds not only use needed soil moisture, but cause further trouble by disseminating seed. Thorough cultivation should be practiced every season until the trees have reached such a size as to make it impossible to work between the rows with the 1-horse cultivator.

MULCHING.

The artificial mulching of shelter-belt trees with straw, manure, or any similar material is not recommended, for the reason that there is insufficient experimental evidence of its beneficial effect; and it is well known that it may be harmful in many ways, such as furnishing harbors for mice, introducing weed seeds, and increasing the danger from fire.

After the trees become too large and close together to cultivate the falling leaves will form their own mulch. This is the natural forest condition in which they will best thrive.

PRUNING.

Do not prune your shelter-belt trees. A thick, dense growth is the only proper method of growing a shelter belt. The reasons are as follows:

(1) It is the natural method of growth, affording protection from the hot sun and drying winds of both summer and winter to the trees making up the shelter belt.

(2) The bushy natural growth protects the trunks of the trees from sun scald, which may weaken, badly damage, or even kill the trees.

(3) Unpruned trees soon interlap and shade the ground. This prevents the growth of grass and weeds and checks the loss of water from the soil.

(4) An unpruned shelter belt will afford protection to itself from wind. The individual trees will not be switched around by heavy winds until they become loosened and dry out, as they may be when trimmed up from 2 to 5 feet.

(5) Unpruned trees will sooner protect your buildings, garden, and stock, which is the purpose for which the shelter belt was planted.

EXCEPTIONAL CONDITIONS SOMETIMES JUSTIFY PRUNING.

If the young trees are frozen to the ground for a few years in succession they will become too bushy at the base and make no growth in height. To stimulate an upward growth, cut away all branches

except one at the ground close to the trunk. Allow this to become the leader for a new trunk. Do not prune the branches that it sends out, but allow it to grow as bushy as it will.

Dead wood should be removed. Cut the branches close to the living wood and leave no stubs.

INSECT PESTS.[1]

In common with all other plants, trees are subject to the attacks of certain insect pests. Poplar beetles and their black larval or wormlike stages eat willow and poplar leaves. These beetles suggest the Colorado potato beetle in shape, but they are somewhat smaller and are black in color tinged with blue and more or less striped or spotted with yellow or orange. They appear when the leaves begin to come out in the spring and are at their worst during the month of June, though if not killed they may produce from four to five generations before fall, with disastrous results to the foliage and the subsequent death of the trees. Spraying with lead arsenate, prepared as directed by manufacturers on the containers, will effectually kill them. The spraying will yield most satisfactory results if done when the leaves are about half grown. A heavy reappearance of the beetles may necessitate repetition of the treatment during the season.

The large, green, wormlike larvæ of certain moths are very destructive to the foliage of poplars and box elders. One large worm may eat all the leaves on a young tree in a short time. A thorough spraying of lead arsenate should control this pest. Hand picking is also often resorted to.

Leaf miners work between the two surfaces of a leaf, either eating all the inner tissues or merely eating a tunnel in the leaf until they come out. The leaf turns black when all the tissue is eaten or shows a brown track when tunneled. As these insects are protected by the leaf surface, it is rather difficult to control them. They generally do not come in numbers large enough to do a great deal of damage. They work almost wholly on the poplar, but are occasionally seen on the box elder. A lead-arsenate spraying as soon as the leaves are formed should kill the miners before they penetrate the leaf surface.

The leaf-cutter bees may be destructive to the leaves in cutting out small circles for their nests. While they will often cut the leaves of an ash, or sometimes a box elder, to a skeleton, they do not seem to damage the tree as far as its growth is concerned. They generally work during midsummer after the tree has made its growth. As they do not eat the pieces of leaves cut, they can not very well be destroyed by poison spray.

[1] These statements in reference to insects have been approved by the Bureau of Entomology.

Blister beetles are found on the young shoots of the caragana in the month of June. They are of three kinds, the gray and the black (about three-fourths of an inch to 1 inch long), and the metallic blue (1 to 2 inches long). Spraying does not seem to kill them, but drives them to other plants. The caragana does not seem to suffer much from them and will often put out new leaves after being eaten. Blister beetles also attack alfalfa and beans in restricted spots.

ANIMAL PESTS.

The jack rabbit is the worst animal pest with which the grower of trees has to contend. It not only strips the bark from the older trees but will cut off seedlings at the ground or snow line. It especially prefers elm and ash, but will cut off poplar and willow branches in the winter where they protrude above the snow. Rabbits, however, like alfalfa better than trees; and if a stack of alfalfa is near by, they will very seldom bother the trees. The following formulas for poisoning them are recommended by the United States Biological Survey:

Poisoned oats.—Heat 1½ pints of water to boiling. Add 1 ounce of salt. Dissolve 2 ounces of laundry starch to the consistency of thick cream and add to the salt water. Stir well and add 1 ounce of strychnin and 1 ounce of baking soda. Mix thoroughly and pour while hot over 12 quarts of oats, wheat, or corn. Place in piles on shingles at intervals along the edge of the shelter belt out of the reach of stock. If placed at night and removed in the morning, the danger of poisoning chickens and birds will be minimized. This bait is also effective for mice.

Poisoned alfalfa leaves.—Dissolve 1 ounce of strychnin sulphate in 2 gallons of hot water and sprinkle over 10 pounds of alfalfa hay leaves. Mix the leaves thoroughly until all moisture is absorbed.

Poison wash.—Dissolve 1 ounce of strychnin sulphate in 3 quarts of boiling water. Dissolve half a pound of laundry starch in 1 pint of cold water, stirring thoroughly. Pour the starch into the vessel containing the strychnin and boil the mixture a short time until the starch is clear. Add 6 ounces of glycerin and stir. Wheen cool enough, apply to the tree trunks with a paint brush. As the shelter belt is fenced, no danger from stock can occur.

Stock of all kinds eat the branches and leaves of both young and old trees. It is necessary, therefore, to have the shelter belt fenced securely at all times. This is required by the agreement by which the farmer receives the assistance of the Department of Agriculture, and a failure to provide this fence is sufficient cause for canceling cooperative work with any farmer.

DISEASES.

Trees are also subject to disease, but the varieties used in the cooperative shelter-belt work have only a few serious diseases.

Poplars are subject to canker. This appears as a swelling on the side of the trunk or at a crotch. When in the earlier stages it cracks

open and a brownish fluid flows from it. When the canker is older the central part dies and the bark breaks away; the limb above the diseased portion dies, as the disease girdles the tree. It works down through the woody tissue and is more extensive than is apparent on the surface. The only safe course is to root out the tree and burn it. Unless the branch on which the canker occurs is cut back for some distance below the outside swelling it does but little good to prune.

Willows are sometimes affected by a disease which turns the branches black, beginning with the tip. The branches may be cut back; but as this disease also works under the bark more than is apparent on the outside, digging out and burning the entire tree is to be recommended.

Approved:

WM. A. TAYLOR,
Chief of Bureau.

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